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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

11 June 1969

The Honorable Gerard C. Smith
The Director, US Arms Control
and Disarmament Agency
Department of State
Washington, D. C.

Dear Mr. Smith

At the Steering Committee meeting on 28 May 1969, Mr. Packard asked me to have the Verification Panel sit down with a representative from DDR&E to review the question of the US ability to monitor Soviet compliance with a MIRV test ban.

That has been done and I forward the results of that review by the Verification Panel for such further action as you deem necessary.

Sincerely,

[redacted]
Director
Strategic Research

Attachment:
TS 199030/69

Copy furnished:
The Honorable David Packard
Deputy Secretary of Defense

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10 June 1969

MEMORANDUM FOR: Members of the NSSM-28 Working Group

SUBJECT : Monitoring Soviet Compliance with a MIRV Flight-test Ban

In accordance with Secretary Packard's request, the Verification Panel has reviewed the question of US ability to monitor a MIRV test ban in the light of the concerns expressed by Dr. Fink and members of his panel that there were various possible means by which the Soviets might successfully conceal the existence of a MIRV test program. In this review we assumed that a MIRV ban would include a ban on the flight testing of multiple RVs, post-boost maneuvering vehicles and endo-penaids.

The review was made with the active participation of a representative of the DDR&E, who brought up a series of approaches the Soviets could take in an effort to develop MIRVs for ICBMs clandestinely (See Tab A) and presented by way of example a hypothetical program for clandestine development of a MIRV using the P-ball approach (See Tab B).

The Panel agrees that there are a number of ways in which an ingenious opponent might be able to conceal the purpose of any given flight test during a MIRV development program. In the specific and well-reasoned deception development program hypothesized by the DDR&E, [redacted] testing would involve only one reentry vehicle and its maneuvering would be shrouded or carried on beyond the range of our radar and optical sensors, the flight and reentry profile would be altered to cover the significantly different throw-weight characteristics, motor thrusts for maneuvering would be kept below the threshhold of infra-red detectors [redacted],

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After careful review, the Panel has concluded that there are a number of practical considerations which would militate against successful concealment in this manner of an entire MIRV R&D program. Such a program, it must be noted, would necessarily involve numerous tests over a period of one to two years if the Soviets were to have any confidence in it. These considerations are as follows:

a. The basic requirement that there be repeated flight tests to develop a reliable and accurate MIRV system implies that the program would be constantly exposed to the risk of detection by US collection systems. [redacted] the fact that some kind of flight test was going on would be open to detection--and with no assurance to the Soviets that the deception techniques were in fact sufficient to defeat US collection systems. It is possible that the very first test might prove a giveaway.

b. The Soviet Union would have great difficulty in avoiding detection of the fact that some sort of testing was going on, particularly as new U.S. sensors become operational. The Soviets could develop new and remote test ranges but the need for instrumentation and communications would make it virtually impossible to conceal such developments. Extended range testing, which eventually would be necessary to provide any real confidence in the system, would require use of the broad ocean area impact zones where the U.S. would be able to monitor the reentry event to impact.

c. The Soviet risk would be increased by the likelihood that at least some of the tests would probably be failures involving unpredictable and aberrant behavior--indeed, a principal objective of an R&D test program is to detect and correct likely causes of malfunction before deployment begins. In some of these failures the Soviets could not have high confidence of circumventing U.S. detection.

d. In every instance the Panel examined, the measures introduced to conceal the fact that the tests

were of MIRVs would create changes in the normal pattern of operation. This would induce program anomalies which of themselves would serve to alert US intelligence that something suspicious was going on even though the details might not be clear.

e. Concealment measures would impose a penalty not only in terms of money but in terms of test program effectiveness. [redacted]

In addition to the above general considerations we consider that a Soviet attempt to retrofit their SS-9 force with MIRVs prior to full system tests would entail serious risks, particularly in view of the high confidence requirements associated with a high accuracy MIRV. Also the Soviets would need to have confidence firings of their operationally deployed MIRVs to assure themselves of adequate systems reliability. The Verification Panel has not assessed the willingness of the Soviets to accept the risks involved.

Accordingly, the Verification Panel sees no need to alter the findings cited in its initial report as follows:

> Our capability to verify the testing MIRVs and other specified reentry vehicles is good and should improve during the period under consideration. Even with present verification systems, we have confidence of timely detection of MIRV testing for ICBMs and a somewhat lesser level of confidence regarding shorter range missiles. The chances are only about even that we would detect the testing of MIRVs for SLBMs. If the Soviets complete RDT&E or a MIRV system prior to an agreement, verification of a ban on actual deployment of MIRVs would be difficult, if not impossible, by national means.

Our confidence is based on the continuance of existing technical collection means and the successful deployment of programmed collection systems that should be available in the early 1970's.

CLARENCE W. BAIER
Chairman
Verification Panel of the Interagency
Working Group for NSSM-28

MIRV Implementation Possibilities

TAB A

chnique	Characteristics	Footprint Capabilities	Mission Implications	Test Ban Implications
Bus	Single guidance and propulsion unit sequentially changes orbit of each object	Greater than 10000 sq.mi.limited by spacing and number of objects	Suggests counterforce but depends on number, yield and accuracy	[redacted] Multiple RVs can be obscured by pen aids
P-Ball	Guidance and propulsion in each RV	Similar to Bus	Same as bus but greater accuracy potential	Test of single RV gives high confidence of MIRV capability without disclosure
MBRV	Guidance and attitude control in each RV	Approx. 1000 sq. mi. limited by control weight and RV aerodynamics	Suggests penetration but does not rule out counterforce	Same as for 2
BGRV	High altitude atmospheric midcourse trajectory with accurate independent guidance	Greater than 100000 sq.mi.	Needs terminal guidance for counterforce.Low terminal velocity for a penetrator	Same as for 2
Release of RVs from Booster	Individual release on sensed velocity from booster guidance without additional propulsion	Less than 1000 sq.mi. with restrictions in center of footprint	Counterforce only if target spacing compatible with small footprint	[redacted]
Ejection of RVs from Booster	Similar to 5 but additional energy imparted to each RV	Same as 5 when reasonable accuracy is maintained	Tends to dimish accuracy necessary for counterforce	Difficult to distinguish from Polaris AB testing

[redacted]

Deceptive MIRV Development TAB B

Technique 2. - Test Single P-Ball RV on SS-9

A. Detection Possibilities

[redacted]

[redacted]

3. Boost plane/re-entry plane compatibility -

[redacted]

b) Can bring RV back to boost plane before apogee

4. Throw weight/re-entry weight compatibility -

a) Loft to 50 deg. with chaff and single 3500# RV ostensibly to enhance chaff survivability, defeat Spartan loiter mode, and improve accuracy. This configuration sensibly explain the total use of throw weight/range while testing a single P-ball.

b) Use RV with β = 2000 and quench wake to deny weight measurement. Note, however, that very blunt bodies may be roughly (factor of 2) weighed by nose RCS or by bow shock air radiation. This argues for an RV with $R_n/R_b \sim$ 0.25 or less. High altitude drag measurements which may be a weight discriminant are denied by chaff. Limit look angles and low altitude data by remote impact area.

5. Ground based optics - IR capability as stated above (A.2).

[redacted]

6. [redacted]

B. R&D Program

System development may start with a single RV on a booster other than SS-9. A minimum number of flights on the SS-9 to validate total system.

1. Launch point - [redacted]

2. Impact point - [redacted]

3. Number of flight tests - [redacted]

4. Lead time to first flight - [redacted]

C. Operational Tests -

1. Single RV - from operational silos for crew training at one per month for about six months. [redacted]

2. Multiple RVs - 5 within one month for proof test at decision to abrogate.